

REMARKS

The applicant respectfully requests reconsideration in view of the amendments and the following remarks. Support for amended claim 1 can be found in the published specification at paragraph no. 0021 and in claim 7.

Claims 1-17, 19, 20 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Frauenkron (US Patent 6,562,971) ("Frauenkron"). Claims 11-17 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3, and 5-9 of U.S. Patent No. 7,115,742 ("742 patent"). Claims 11-17 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3, 9, 10, 13, and 14 of Frauenkron. The applicant respectfully traverses these rejections.

102 (b) Rejection

Claims 1-17, 19, 20 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Frauenkron. The applicant's claimed invention requires a molar $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratio of greater than 10:1 to 1200:1 (see the applicant's claim 1). Frauenkron teaches away from the applicant's claimed molar ratio. In Frauenkron, a molar $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratio is from greater than 1400:1 to 40,000:1 is described (see the abstract, col. 4, lines 27-28, col. 8, lines 22-25 and claim 1 of Frauenkron).

Frauenkron discloses at col. 8, lines 10-39:

The zeolite employed as catalyst in the process according to the invention for the preparation of TEDA has a skeletal structure which principally consists of silicon dioxide (SiO_2).

Besides silicon dioxide, the zeolite may also contain traces of other divalent, trivalent or tetravalent metals **M (oxidation state of the metals II, III or IV)** in the form of metal oxides $\text{M}_{2/z}\text{O}$ ($z=2, 3$ or 4), where the molar ratio of silicon dioxide and the metal oxide, $\text{SiO}_2/\text{M}_{2/z}\text{O}$ (this molar ratio is also known as the 'modulus') is greater than 10 for tetravalent metals ($z=4$), greater than 100 for divalent and trivalent metals ($z=2$ or 3) and greater than 1400 for $\text{M}=\text{Al}$ ($z=3$).

The zeolite catalysts preferably used in the process according to the invention have, for $M=Al$, an SiO_2/M_2O_3 molar ratio of from greater than 1400 to 40,000:1, in particular from greater than 1400 to 5000:1, for M =metal in oxidation state II or M =two or more metals in oxidation state II, have an SiO_2/MO molar ratio of from greater than 100 to 40,000:1, in particular from greater than 200 to 5000:1, for M =metal in oxidation state III or M =two or more metals in oxidation state III, have an SiO_2/M_2O_3 molar ratio of from greater than 100 to 40,000:1, in particular from greater than 200 to 5000:1, and for M =metal in oxidation state IV or M =two or more metals in oxidation state IV, have an SiO_2/MO_2 molar ratio of from greater than 10 to 40,000:1, in particular from greater than 25 to 5000:1. (emphasis added)

For Al_2O_3 , Frauenkron teaches that the molar ratio of SiO_2/Al_2O_3 is **from greater than 1400 to 40,000:1, in particular from greater than 1400 to 5000:1** **Frauenkron minimum ratio is greater than 1400 while the applicant's claimed maximum ratio is 1200.** Therefore, not only does Frauenkron not anticipate the applicant's claimed invention (a molar SiO_2/Al_2O_3 ratio of greater than 10:1 to 1200:1), Frauenkron teaches away from the applicant's claimed invention to have at least a molar ratio of SiO_2/Al_2O_3 being **greater than 1400**. Therefore, the claimed invention is not anticipated by nor rendered obvious over Frauenkron.

Non-Statutory Obviousness Type Double Patenting Rejections

Claims 11-17 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3, 9, 10, 13, and 14 of Frauenkron. Claims 11-17 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3, and 5-9 of the '742 patent.

Obviousness-type double patenting as defined is when claims in a patent application are not patentably distinguishable from claims in a patent (MPEP 804). The test applied to

determine obviousness-type double patenting exists is whether or not the claims in the application define merely an obvious variation of the invention disclosed and claimed in the patent (In re Vogel and Vogel, 164 USPQ 619 (CCPA 1970). If claims are unobvious over 35 U.S.C. §103, there can be no double patenting (In re White and Langer, 160 USPQ 417 (CCPA 1969)). Further, the overlapping of claims is not a significant or controlling factor in obviousness-type double patenting (In re Longi et al., 225 USPQ 645 (CAFC 1985)). The proper consideration of obviousness type doubling patenting is the improper extension of the patent right. The applicants believe that these patents are patentably distinct from the application because there is no overlap in the applicant's claimed invention and Frauenkron's claimed invention and the claims of the '742 patent. This application contains the following main claims 1, 11, 19 and 22.

1. **A method of increasing the cutting hardness of a shaped body** comprising a crystalline aluminosilicate **having an SiO₂/Al₂O₃ molar ratio of greater than 10:1 to 1200:1**, wherein the shaped body comprises a binder selected from among oxides of silicon and/or zirconium and **is** treated with a gas consisting of water vapor at from 100 to 600°C and an absolute pressure of from 0.1 to 10 bar for a period of at least 20 hours and the shaped body has been calcined at from 100 to 600°C before the treatment with water vapor.

11. A process for preparing triethylenediamine (TEDA) by reaction of ethylenediamine (EDA) and/or piperazine (PIP) in the presence of a crystalline aluminosilicate catalyst, wherein a shaped body whose cutting hardness has been increased beforehand **using a method according to claim 1 is used as catalyst**.

19. A process for chemical synthesis carried out in the presence of a crystalline aluminosilicate catalyst, wherein **a shaped body whose cutting hardness has been increased beforehand using a method according to claim 1 is used as catalyst**.

22. (Previously presented) A **shaped body** prepared by **the method as claimed in claim 1**. (emphasis added)

In all the claims of the present application, the applicant require using the method of claim 1 which **claims a $\text{SiO}_2/\text{Al}_2\text{O}_3$ molar ratio of greater than 10:1 to 1200:1.**

Frauenkron independent claim 1 states:

1. A process for the preparation of triethylenediamine (TEDA), which comprises reacting ethylenediamine (EDA) and one or more amine compounds selected from the group consisting of monoethanolamine, diethanolamine, triethanolamine, piperazine (PIP), diethylenetriamine, triethylenetetramine, tri(2-aminoethyl)amine, N-(2-aminoethyl)ethanolamine, N-(2-hydroxyethyl)piperazine and N-(2-aminoethyl)piperazine, in the presence of a zeolite catalyst, wherein the zeolite catalyst comprises one or more metals **M in oxidation state III or IV as oxides, and for $\text{M}=\text{Al}$, has an $\text{SiO}_2/\text{M}_2\text{O}_3$ molar ratio of greater than 1400:1 to 40,000:1,** for $\text{M}=\text{metal}$ in oxidation state III or $\text{M}=\text{two or more metals}$ in oxidation state III, has an $\text{SiO}_2/\text{M}_2\text{O}_3$ molar ratio of from greater than 100:1 to 40,000:1, and for $\text{M}=\text{metal}$ in oxidation state IV or $\text{M}=\text{two or more metals}$ in oxidation state IV, has an $\text{SiO}_2/\text{M}_2\text{O}_3$ molar ratio of from greater than 100:1 to 40,000:1, and the reaction temperature is from 250 to 500°C. (emphasis added)

As stated above, Frauenkron **does not claim a $\text{SiO}_2/\text{Al}_2\text{O}_3$ molar ratio of greater than 10:1 to 1200:1.** Frauenkron **claims a $\text{SiO}_2/\text{Al}_2\text{O}_3$ molar ratio of greater than 1400:1 to 40,000:1.** This is clearly outside the range claimed by the applicant. There clearly is no overlap in the claims. For the above reasons, this rejection should be withdrawn.

The '742 patent has the following claims 1, 21 and 24.

1. A process for the preparation of triethylenediamine (TEDA) characterized by reaction of ethylenediamine (EDA) in the presence of a zeolite catalyst, wherein the reaction is carried out in the presence of from 14 to 300% by weight of water, based on EDA employed, and wherein the zeolite catalyst comprises a **metal M** in oxidation state III, selected from the group consisting of **B, Fe, Co, Ni, V, Mo, Mn, As, Sb, Bi, La, Ga, In, Y, Sc and Cr, and mixtures thereof,** or oxidation state IV, selected from the group consisting of Ti, Zr, Ge, Hf and Sn, and mixtures thereof, as oxides, and for $\text{M}=\text{metal}$ in oxidation state III, has an $\text{SiO}_2/\text{M}_2\text{O}_3$ molar ratio of greater than 100:1 to 40,000:1, and for $\text{M}=\text{metal}$ in oxidation state IV, has an $\text{SiO}_2/\text{M}_2\text{O}_3$ molar ratio of greater than 10:1 to 40,000:1, and the reaction temperature is from 250 to 500°C. (emphasis added)

21. A process for the preparation of a solution of TEDA, which comprises

preparing TEDA as claimed in claim 1, evaporating the prepared TEDA, and passing the vapor-form TEDA into a liquid solvent. (emphasis added)

24. A process for the preparation of triethylenediamine (TEDA) by reaction of ethylenediamine (EDA) in the presence of a zeolite catalyst, wherein the reaction is carried out in the presence of from 14 to 300% by weight of water, based on EDA employed, and wherein the zeolite catalyst comprises a metal **M in oxidation state III, selected from the group consisting of B, Fe, Co, Ni, V, Mo, Mn, As, Sb, Bi, La, Ga, In, Y, Sc and Cr, and mixtures thereof**, or oxidation state IV, selected from the group consisting of Ti, Zr, Ge, Hf and Sn, and mixtures thereof, as oxides, and for M=metal in oxidation state III, has an $\text{SiO}_2/\text{M}_2\text{O}_3$ molar ratio of greater than 100:1 to 40,000:1, and for M=metal in oxidation state IV, has an SiO_2/MO_2 molar ratio of greater than 10:1 to 40,000:1, the reaction temperature is from 250 to 500⁰ C., and wherein the reaction is carried out in the presence of ammonia. (emphasis added)

The '742 patent does not claim aluminum (Al) for M in the oxidation state III as is required by the applicant's claimed invention. The '742 patent claims that **M in oxidation state III, is selected from the group consisting of B, Fe, Co, Ni, V, Mo, Mn, As, Sb, Bi, La, Ga, In, Y, Sc and Cr, and mixtures thereof**. Again, Al which is claimed by the applicant's claimed invention is not claimed by the '742 patent. For the above reasons, this rejection should be withdrawn.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 03-2775, under Order No. 12810-00175-US from which the undersigned is authorized to draw.

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Respectfully submitted,

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